CLAIMS

1.   A method for posting a message on a message list accessible to a plurality of processors, said method comprising:

        selecting a new-message slot;

        placing said message in said new-message slot; and

        modifying said new-message slot to specify an intended recipient of said message, said intended recipient being selected from said plurality of processors.

2.   The method of claim 1 further comprising inserting said new-message slot into said message list, said message list including a first existing-message slot having a pointer to a second existing-message slot.

3.   The method of claim 2 wherein inserting said new-message slot into said message list comprises setting a first pointer on said new-message slot to point to said first existing-message slot and a second pointer on said new-message slot to point to said second existing message-slot.

4.   The method of claim 3 wherein inserting said new-message slot into said message list further comprises setting said pointer associated with said first existing-message slot to point to said new-message slot.

5.   The method of claim 1 wherein modifying said new-message slot to specify an intended recipient comprises modifying a destination mask associated with said new-message slot, said destination mask including information specifying all intended recipients of said message.

6.   The method of claim 5 wherein modifying said destination mask comprises:

        selecting, from a plurality of constituent data-elements of said destination mask, each of said constituent data-elements corresponding to one of

said processors from said plurality of processors, a selected data-element corresponding to a selected processor; and

modifying said selected data-element to indicate that said selected processor is an intended recipient.

7. The method of claim 1 further comprising updating a message directory to indicate the presence of said new-message slot in said message list, said message directory being accessible to said plurality of processors.

8. The method of claim 7 wherein updating said message directory comprises updating an attention mask containing information indicative of which processors from said plurality of processors are intended recipients of messages contained in said message list.

9. The method of claim 7 wherein updating said attention mask comprises:

selecting from a plurality of constituent data-elements of said attention mask, each of said constituent data-elements corresponding to one of said processors from said plurality of processors, a selected data-element corresponding to a selected processor; and

modifying said selected data-element to indicate existence of a new message for which said selected processor is an intended recipient.

10. A method for retrieving, from a message list accessible to a plurality of processors, a message intended for a selected processor from said plurality of processors, said method comprising:

determining whether said message list includes a message slot having a message for said selected processor;

if said message list includes a message slot having a message for said selected processor,

reading said message from said message slot; and

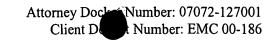modifying said message slot to indicate that said selected processor has encountered said message slot.

11. The method of claim 10 wherein determining whether said message list includes a message slot having a message for said selected processor comprises inspecting a destination mask associated with said message slot, said destination mask including information indicative of all intended recipients of a message contained in said message slot.

12. The method of claim 11 wherein inspecting said destination mask comprises:

inspecting a selected constituent-data-element from said destination mask, said selected constituent-data-element corresponding to said selected processor and being selected from a plurality of constituent data-elements, each of which corresponds to a processor from said plurality of processors; and

determining, from said selected constituent data-element, whether said selected processor is an intended recipient of said message contained in said message slot.

13. The method of claim 10 wherein determining whether said message list includes message slot having a message for said selected processor comprises inspecting a message directory, said message directory including information indicative of all processors having at least one unread message in said message list.

14. The method of claim 13 wherein inspecting said message directory comprises inspecting an attention mask in said message directory, said attention mask including information indicative of all processors having at least one unread message in said message list.

15. The method of claim 14 wherein inspecting said attention mask comprises:

inspecting a selected constituent-data-element from said attention mask, said selected constituent-data-element corresponding to said selected processor and being selected from a plurality of constituent data-elements, each of which corresponds to a processor from said plurality of processors; and

determining, from said selected constituent data-element, whether there exists a message in said message list for which said selected processor is an intended recipient.

16. The method of claim 10 further comprising determining whether said selected processor has already encountered said message slot.

17. The method of claim 16 wherein determining whether said selected processor has already encountered said message slot comprises inspecting an execution mask associated with said message slot, said execution mask containing information indicative of which intended recipients for a message in said message slot have encountered said message.

18. The method of claim 17 wherein inspecting said execution mask comprises:

inspecting a selected constituent-data-element from said execution mask, said selected constituent-data-element corresponding to said selected processor and being selected from a plurality of constituent data-elements, each of which corresponds to a processor from said plurality of processors; and

determining, from said selected constituent data-element, whether said selected processor has encountered said message slot.

19. The method of claim 10 further comprising modifying said message slot to indicate that said selected processor has encountered said message slot.

20. The method of claim 19 wherein modifying said message slot comprises modifying an execution mask associated with said message slot, said execution

mask containing information indicative of which intended recipients for a
message in said message slot have encountered said message.

21.   The method of claim **20** wherein modifying said execution mask comprises:

> selecting a constituent data-element from said execution mask, said
> selected constituent-data-element corresponding to said selected
> processor and being selected from a plurality of constituent data-
> elements, each of which corresponds to a processor from said plurality
> of processors; and

> modifying said selected constituent-data-element to indicate that said
> selected processor has encountered said message slot.

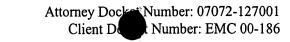22.   The method of claim **10** further comprising:

> determining if all intended recipients for said message have encountered
> said message, thereby identifying said message slot as a spent
> message-slot;

> if said message slot is a spent message-slot, removing said spent
> message-slot from said message-list.

23.   The method of claim **22** wherein removing said spent message-slot from said
message list comprises modifying said spent message-slot to indicate that a
message contained in said spent message-slot has no intended recipients.

24.   The method of claim **23** wherein removing said spent message-slot from said
message list further comprises:

> identifying a first message-slot immediately preceding said spent
> message-slot;

> identifying a second message-slot immediately following said spent
> message-slot; and

setting a pointer associated with said first message-slot to point to said second message-slot.

25. The method of claim **10** further comprising determining whether there exist unread messages for said selected processor, and, if no unread messages exist, modifying a message directory to indicate absence of unread messages for said selected processor.

26. A data storage system comprising:

    a plurality of processors;

    a shared memory accessible to each processor in said plurality of processors;

    a message section in said shared memory, said message section including a message list having an ordered sequence of message slots, each of said message slots including;

        a static-information repository for static information specifying all intended recipients of a message carried by said message slot; and

        a dynamic-information repository for dynamic information specifying which of said intended recipients have encountered said message slot.

27. The data storage system of claim **26** further comprising a message directory for storing information concerning said message list.

28. The data storage system of claim **27** wherein said message directory stores information indicating existence in said message list of an unread message for which a selected processor from said plurality of processors is an intended recipient.

29. The data storage system of claim **28** wherein said message directory comprises:

an attention mask having a data element corresponding to said selected processor, said data element having two states, one of which indicates that said processor does not have an unread message in said message list.

30. The data storage system of claim **27** wherein said message directory comprises a first-message pointer pointing to a first message-slot in said message list, a last-message pointer pointing to a last message-slot in said message list; and a length field indicating the number of message slots in said message list.

31. The data storage system of claim **27** wherein said message directory comprises a lock field that, when set, prevents all but one of said processors from said plurality of processors from modifying said message section.

32. The data storage system of claim **26** wherein static-information repository comprises a destination mask having a plurality of data elements, each of which corresponds to a processor from said plurality of processors, each data element having a first state indicating that a corresponding processor is an intended recipient of said message and a second state indicating that said corresponding processor is not an intended recipient of said message.

33. The data storage system of claim **26** wherein said dynamic-information repository comprises an execution mask having a plurality of data elements, each of which corresponds to a processor from said plurality of processors, each data element having a first state indicating that a corresponding processor has encountered said message and a second state indicating that said corresponding processor has not encountered said message.